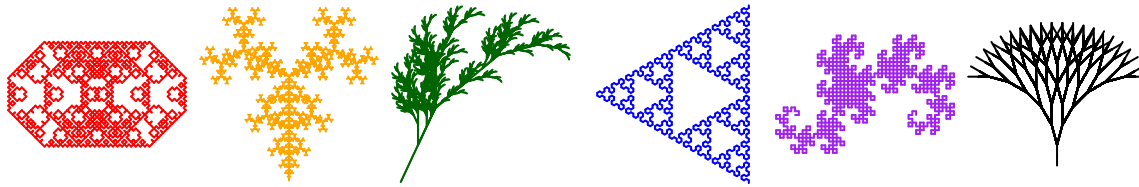


## PCW\_0929: Lindenmayer Systems and Turtle Graphics



A [Lindenmayer system](#) (or L-system) is a set of rewrite rules. When these rules are repeatedly applied to a starting string (“word”), we can get complex results from simple rules.

### Example

Start:

x

Rules:

A  $\rightarrow$  A-

x  $\rightarrow$  Ax

-  $\rightarrow$  -

(The “-” character is a constant. We usually don’t bother listing constants.)

The start string and first 4 recursions:

0. x

1. Ax

2. A-Ax

3. A--A-Ax

4. A---A--A-Ax

### Practice

Start:

A

Rules:

A  $\rightarrow$  -B

B  $\rightarrow$  -AB

The start string and first 4 recursions:

When L-system strings' characters correspond to drawing commands, we can get fractal-like patterns.

Use the following table of drawing commands:

F = Move forward one step while drawing line  
X = Move forward one step without drawing line  
+ = Turn right 90°  
- = Turn left 90°  
[ = Save current position (x, y, and direction) to top of list  
] = Teleport to top-of-list position (without drawing); erase top-of-list position

Starting at (0,0) pointing up, draw the pattern described by the commands in the string below:

xx [+FFF-FFxx+F-FF-FF-F [-F+F] F-F] [-FFF+FFxx-F+FF+FF  
+F [+F-F] F+F] xx [+F-F] [-F+F]

